

CLAIMS:

1. A rotary sprinkler head comprising:
 - a main housing having a main fluid inlet;
 - a turbine assembly mounted in the main housing, wherein the turbine assembly includes
 - a turbine housing having an inlet port and at least one outlet port, and defining a rotor chamber therein;
 - a rotor rotatably mounted in the turbine housing, wherein the rotor is rotated by a flow of fluid through the turbine housing;
 - a flow control valve slidably engaged with the turbine housing to move between a first position and a second position, wherein the second position allows fluid flow through the main housing to bypass the inlet port to the turbine housing and throttles the at least one outlet port of the turbine housing.
2. The rotary sprinkler head according to claim 1, wherein the main housing includes a valve seat, and the flow control valve includes
 - a fluid contact surface for engaging the valve seat in the closed position, and
 - a sleeve disposed around the turbine housing for throttling the at least one outlet port of the turbine housing.
3. The rotary sprinkler head according to claim 2, further comprising a third position of the flow control valve between the first and second positions such that the

sleeve does not throttle the at least one outlet of the turbine housing when the flow control valve moves between the first and third positions, and increasingly throttles the at least one outlet of the turbine housing when the flow control valve moves from the third position to the second position.

4. The rotary sprinkler according to claim 3, wherein the turbine assembly is constructed such that the rotor rotates at a constant speed as the fluid flow through the turbine housing increases from a rate which places the flow control valve in the third position to a rate which places the flow control valve in the second position.

5. A turbine assembly for a rotary sprinkler head, comprising:
a turbine housing having an inlet port and at least one outlet port;
a rotor rotatably mounted in the turbine housing, wherein the rotator is driven to rotate by a flow of fluid through the turbine housing;
a flow control valve having a first element which controls a portion of a fluid flow entering the inlet port of the turbine housing and a second element which interacts with the at least one outlet port of the turbine housing to control the flow of fluid through the turbine housing.

6. The turbine assembly according to claim 5, wherein the first element of the flow control valve includes a fluid contact surface for diverting a portion of the fluid flow around the turbine assembly, and wherein the second element is a throttling mechanism for throttling the area of the at least one outlet port through which fluid can exit the turbine housing.

7. The turbine assembly according to claim 6, wherein the throttling mechanism is a sleeve which surrounds the turbine housing and is slidably engaged with the housing.

8. A method of operating a rotary sprinkler system with a constant turbine speed, comprising:

initiating a flow of fluid through a main flow path of a sprinkler head and through a turbine assembly mounted in the sprinkler head;

driving a rotor in the turbine assembly by contacting the rotor with the fluid as it flows through the turbine assembly;

increasing the flow of fluid through the sprinkler head;

diverting a portion of the fluid flow to bypass the turbine assembly; and

throttling the output of the flow path through the turbine assembly.

9. The method according to claim 8, wherein diverting the portion of the fluid flow is performed upon increasing the fluid flow a first flow rate.

10. The method according to claim 8, wherein throttling the output of the turbine assembly flow path is performed upon increasing the fluid flow to a second flow rate.

11. The method according to claim 8, wherein the diverting the portion of the fluid flow is performed upon increasing the fluid flow a first flow rate and further comprising further increasing the fluid flow to a second flow rate, wherein throttling the output of the turbine assembly flow path is performed upon increasing the fluid flow to a second flow rate.